

## CLAIMS

What is claimed is:

1. A method of in situ monitoring of particles generated by a reaction by-product film peeling from an interior wall of a reaction chamber of a semiconductor fabrication apparatus to determine reaction chamber condition, the method comprising the steps of:

exciting the particles to emit light, the emitted light having a predetermined wavelength associated with the particles;

measuring intensity values of the light emitted at the predetermined wavelength over a predetermined time period; and

comparing the intensity value of the light, measured at a selected time during the predetermined time period, to a predetermined light intensity threshold value wherein if the intensity value of the light measured at the selected time is above the predetermined light intensity threshold value, the chamber condition is abnormal.

2. The method according to claim 1, wherein in the comparing step if the intensity value of the light is equal to or below the predetermined light intensity threshold value, the chamber condition is normal.

3. The method according to claim 1, wherein the selected time comprises about one-half the predetermined time period.

4. The method according to claim 1, wherein the exciting step is performed by generating RF power within the chamber.

5. The method according to claim 4, wherein the exciting step is further performed by pumping a process gas into the chamber.
6. The method according to claim 1, wherein the measuring step is performed by observing the emitted light with an optical emission spectrometer.
7. The method according to claim 1, where the semiconductor fabrication apparatus comprises a plasma etching apparatus.
8. The method according to claim 7, wherein the exciting step is a stage of a waferless autoclean cycle of the apparatus.
9. The method according to claim 1, wherein the exciting step is a stage of a waferless autoclean cycle of the apparatus.
10. The method according to claim 1, wherein the predetermined wavelength is about 703 nanometers.
11. The method according to claim 1, further comprising the step of storing the intensity value of the light measured at the selected time in a trend file.

12. The method according to claim 12, further comprising the step of graphically displaying the intensity value of the light stored in the trend file on a user interface.

13. The method according to claim 12, using data obtained from the trend file for inline process control.

14. A method of in situ monitoring of particles generated by a reaction by-product film peeling from an interior wall of a reaction chamber of a semiconductor fabrication apparatus to determine reaction chamber condition, the method comprising the steps of:

exciting the particles to emit light; and  
comparing an intensity value of the light, measured at a selected time during a predetermined time period, to a predetermined light intensity threshold value.

15. The method according to claim 14, wherein in the comparing step if the intensity value of the light measured at the selected time is above the predetermined light intensity threshold value, the chamber condition is abnormal.

16. The method according to claim 14, wherein in the comparing step if the intensity value of the light is equal to or below the predetermined light intensity threshold value, the chamber condition is normal.